

## **SUBSURFACE RADIATION PHENOMENA DETECTION WITH COMBINED AND AZIMUTHALLY SENSITIVE DETECTORS**

### **Abstract**

A system and method are disclosed for detecting radiation phenomena in an area surrounding a wellbore traversing an earth formation. A logging instrument is equipped with combined radiation detectors to provide multiple measurements at the same axial position along the instrument axis, without the use of rotating parts within the instrument. Shielded or segmented detectors provide azimuthally focused detector sensitivity. A controllable radiation source is optionally disposed on the instrument for subsurface irradiation. Also disclosed is the use of radioactive materials in unison with the logging instrument to determine subsurface flow and reservoir characteristics.